

DEC STD 117-0 Print Sets

DOCUMENT IDENTIFIER: A-DS-EL00117-00-0000 Rev J, 24-Aug-1990

ABSTRACT: This standard establishes criteria for the format, content, and production of print sets. It specifies the type of engineering drawings to be included in a print set and how they are to be organized for a particular hardware product.

APPLICABILITY: This standard is mandatory for engineers, manufacturers, and any other Digital personnel involved in compiling print sets.

STATUS: APPROVED 24-Aug-1990; use VTX SMC for current status.

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Responsible Department: Engineering Information & Image Management
Responsible Person: Al Burke
SMC Writer: Paul Cioto

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Al Burke - Standard Owner

Eric Williams - Standards Process Manager

Direct requests for further information to:

Al Burke
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1 INTRODUCTION

Print sets are compilations of engineering drawings and documents that provide useful technical information required for product maintenance. However, print sets that support to the level of discrete component replacement include material that is inappropriate for field-level maintenance, especially if distributed or sold outside Digital.

The need to protect high-level Digital intellectual property has prompted the establishment of two distinct print sets instead of one (DEC STD 117-0, Rev H, 26-Jul-1988):

- Support Print Set (EM Class)—the complete set of engineering drawings needed by Digital support engineers. This set (formerly called the Field Maintenance Print Set) contains sensitive and proprietary design information and must be labeled accordingly. This set cannot be released to any non-Digital party without a signed nondisclosure or license agreement.
- Field Maintenance Print Set (MP Class)—only those engineering drawings required to support field maintenance of equipment to the Field Replaceable Unit (FRU) level. This set is intended to be used by Digital field engineers and for sale to customers.

The full engineering documentation sets for products existing prior to the release of Rev J of DEC STD 117-0, 24-Aug-1990, will continue to be labeled Field Maintenance Print Set. After that date, print sets for all new products will be in accordance with the then current revision of this standard.

1.1 PURPOSE

This standard establishes new criteria for the contents of print sets in order to eliminate any improper release of sensitive engineering documentation.

It is not the intent of this standard to change the scope or contents of the full documentation set; instead, it has been renamed Support Print Set. This print set must still be produced for each hardware product designed and manufactured by Digital.

Digital's need to maintain strict confidentiality for its sensitive, intellectual property has caused Digital to institute a new format for Field Maintenance Print Sets, one that will allow our branch-level engineers and our customers to perform necessary diagnostic procedures to the FRU level only.

This standard requires the generation of both print sets for all new products as they are released. However, it does not require the creation of the field-level (FRU) print set when a formal product change is instituted through the ECO process.

1.2 SCOPE

The scope of this standard is limited to the definition of the two types of print sets and a description of their format and content. This standard identifies the groups that are responsible for compiling both print sets, specifies the types of engineering drawings to be included in each, and indicates how the print sets are to be organized for a particular hardware product.

For some products, [for example, some Computer Special Systems (CSS) products], the Field Maintenance Print Set is the only documentation required for shipment; for others, additional documentation is required. It is not within the scope of this standard to define the relationship between Field Maintenance Print Sets and other documentation required to support a product. That relationship must be defined in the Maintenance Plan developed by Customer Services Systems Engineering (CSSE) and the Hardware Manual Plan developed by Educational Services Development and Publishing for each specific product.

1.3 RESPONSIBILITIES

The following subheads address responsibilities of Design Engineering, CSSE Maintainability Engineers, Site Design/Drafting groups, Educational Services Development and Publishing, Engineering Information & Image Management, and Site Document Control.

1.3.1 Design Engineers

The design engineer, the support engineer, and the assigned CSSE maintainability engineer define the print sets in accordance with the requirements stated in this standard. These individuals also determine when to increment the print set part revision indicator.

1.3.2 CSSE Maintainability Engineers

The maintainability engineer assigned to the product collaborates with the design engineer in the definition of the print sets and ensures that they meet the requirements of the product's Customer Service Maintenance Plan. The maintainability engineer is also responsible for incorporating the use of the print sets into the Product Documentation Plan, described in *DEC STD 003-0 Hardware Manual Standard*.

The maintainability engineer's responsibilities are described in more detail in the Customer Services New Product Planning Guide.

1.3.3 Site Design/Drafting Groups

The Engineering Services Site Design/Drafting groups are responsible for preparation of all engineering drawings in accordance with the following Digital standards.

DEC STD 162-0 Micrographics: Format and Quality Requirements for Microfilm

DEC STD 182-0 Engineering Documentation Acceptance Criteria

DEC STD 185-1 Requirements for Releasing Unigraphics Data Bases

The Design/Drafting group is not responsible for defining the contents of print sets.

1.3.4 Educational Services Development and Publishing

The Educational Services Development and Publishing organization will ensure that information in other hardware documentation appropriately complements, but does not duplicate, either print set.

1.3.5 Engineering Information & Image Management (Micrographics)

The Engineering Information & Image Management Group (HUO, DTN: 225-4204) is responsible for assigning print set part numbers, maintaining an index of all existing print sets, and distributing the print set index on 35 mm aperture cards to all microfilm reference libraries.

Print sets shall be legible. This group is authorized to reject engineering drawings that do not conform to the quality requirements of DEC STDs 162-0, 182-0, and 195-0.

Documents that appear in a print set must be high contrast and fully legible, produced from the final released drawings (meeting applicable Digital standards), and included in the Table of Contents for that print set. The first sheet is always the Print Set Table of Contents (TC); an example is shown in Figures 1 and 2. This drawing is computer-generated and replaces the preprinted form (DRB 124) defined in *DEC STD 013-0 Standard Engineering Drawing Formats and Forms - Introduction*.

1.3.6 Site Document Control

The Document Control organization at each site is responsible for obtaining print set part numbers from Engineering Information & Image Management and assigning them to site design/drafting groups as required.

1.4 PRODUCTION OF PRINT SETS

Print sets are produced using conventional silver or nonsilver photographic processes, or high quality xerography, depending on the volume required.

Production of the media may be completed either at the site or subcontracted to other graphics organizations or external vendors. Selection of production technique and source is the responsibility of the site.

Completed media will be sent by Engineering Information & Image Management to the designated printing facility when the final engineering documentation package is released. The process is repeated whenever Engineering Change Orders revise drawings included in the Support Print Set and Field Maintenance Print Set. In either case, the media should be received by the printing operation as soon as possible after the drawings are released.

2 SUPPORT PRINT SETS

The following subheads describe Support Print Sets.

2.1 GENERAL

The Support Print Set (EM) must include all of the engineering drawings needed by Digital support engineers, as defined in the product's Product Support Plan. Its purpose is to help engineers troubleshoot and isolate design-related failures of an option or problems with its interaction with other products. This print set is for Digital use only and is not offered for sale, since it contains and refers to sensitive Digital proprietary information.

Other engineering drawings that provide additional information not needed to implement that level of support shall not be included. The intent of this general requirement is to enhance the print set's usefulness and reduce its cost by eliminating unnecessary pages.

If all information needed by Digital Support Engineering is contained within the Field Maintenance Print Set (MP) then a Support Print Set should not be created. For example, if no proprietary information is needed for any level of troubleshooting, then all information might be included in the Field Maintenance Print Set.

This print set should be treated as and labeled DIGITAL CONFIDENTIAL information, as defined in *DEC STD 128-0 Security Classifications for Engineering Intellectual Property Policies and Regulations*.

2.2 PRINT SET PART NUMBER

The site Document Control group responsible for the Support Print Set shall request the print set part number from Engineering Information & Image Management. The number assigned is in the form:

EM-XXXXX-YY Rev ZZZZ

where EM is the part class, per *DEC STD 012-2 Unified Numbering Code For Part Identifier Class Codes*, and XXXXX-01 is the first variation in the unique, sequentially assigned number. If additional Support Print Sets are defined for the same or related products, XXXXX-02, and so on, shall be used.

The print set part revision is assigned and incremented when required by the design engineer and the CSSE maintainability engineer in accordance with *DEC STD 012-0 Part Identification Standard*.

The Engineering Information & Image Management group provides release information of assigned print set part numbers and the titles are entered into the Support Print Set index. The index can be retrieved from any site microfilm reference file, under the heading EM Index.

2.3 TABLE OF CONTENTS

The site Design/Drafting group prepares the Table of Contents drawing from information provided by the design engineer. The Table of Contents will list those selected engineering documents that describe the set of product referenced in the Title block. See Figure 1. It will also list the variations of that product that is covered by the print set.

The Table of Contents for a higher-level option print set may reference one or more complete print sets by print set part number. Those print sets included will provide their own Table of Contents.

When it is necessary to include a complete print set within a higher-level print set, include the word "complete" in parentheses after the print set part number specified in the Table of Contents. If the complete print set is not required in a higher-level print set, the design engineer may select only those drawings from the lower-level print set that are required by the design support engineer and list them separately.

If the complete print set to be included does not have an EM-XXXXX part number, the design engineer must create a TC drawing and have a part number assigned.

Figure 1 : Table of Contents Sample (EM class)

THIS PRINT SET AND THE SPECIFICATIONS CONTAINED HEREIN ARE DIGITAL CONFIDENTIAL. THEY ARE THE PROPERTY OF DIGITAL EQUIPMENT CORPORATION AND SHALL NOT BE REPRODUCED OR COPIED OR USED IN WHOLE OR IN PART AS THE BASIS FOR MANUFACTURING OR SALE OF ITEMS, OR FOR ANY OTHER PURPOSE, WITHOUT WRITTEN PERMISSION OF DIGITAL. THIS IS AN UNPUBLISHED WORK PROTECTED UNDER THE FEDERAL COPYRIGHT LAWS.																
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						FILE NAME: LLF01TC.LST			SHEET 1 OF 1 NU							

2.4 CONTENTS AND ORGANIZATION

The design engineer and the maintainability engineer will determine the contents of the Support Print Set. When the print set organization impacts the Product Documentation Plan for the product, Educational Services Development and Publishing will provide assistance (if required). For example, contents can be:

- Table of Contents (TC)
- Module Drawing Directory (DD) for module revision information, in DRB 126C format. See *DEC STD 024-1 Top Document Requirements - DRB 126C Format*.
- Module Unit Assembly (UA) for parts location

NOTE

Exclude the Drill and Etch Drawing (MD).

- Module Parts List (PL) for parts identification
- Module Circuit Schematics (CS) for troubleshooting
- Any timing diagrams, flow charts, or block diagrams that will be useful to the Digital support engineer for troubleshooting

2.5 EXCLUDED ENGINEERING DRAWINGS

The following types of engineering drawings are not required in the Support Print Set.

- Mechanical fabrication drawings and other types of drawings of parts that cannot be repaired in the field. Some mechanical drawings may be included per subhead 2.4.
- Tabular drawings and documents, such as wirelists, ROM lists, or microcode lists. These types of lists must be included in the Maintenance Documentation Service (MDS) and Customer Service Microfiche Libraries for the particular product. This activity is coordinated by the assigned maintainability engineer.
- The 50- numbered MD drawings that show drill hole locations on modules and EC drawings that show the printed-circuit pattern.
- Engineering specifications, unless they are intended for Customer Service use.
- Purchase specifications.
- Documentation of internal IC functions.
- Documentation that is classified "Digital Restricted Distribution" per requirements of *DEC STD 128-0 Security Classifications for Engineering Intellectual Property Policies and Procedures*

3 FIELD MAINTENANCE PRINT SETS

The following subheads describe Field Maintenance Print Sets.

3.1 GENERAL

The Field Maintenance Print Set (MP) shall allow the Digital field engineer, or the self-maintenance customer, the ability to isolate failures to the FRU level—as defined in the product's Customer Service Maintenance Plan.

This print set shall *not* contain any material labeled DIGITAL RESTRICTED DISTRIBUTION, DIGITAL CONFIDENTIAL, or DIGITAL INTERNAL USE ONLY information or material. Drawings that are improperly labeled with one of these classifications must acquire ECOs to remove the classification before these drawings are included in the Field Maintenance Print Set.

Other engineering drawings that provide additional information not needed to implement that level of maintenance shall not be included. The intent of this general requirement is to ensure useful and cost-effective Field Maintenance Print Sets.

NOTE

The Field Maintenance Print Set shall support only to the FRU level, and not to the level of discrete component replacement. The maintenance strategy supported by the Field Maintenance Print Set must be explicitly stated in the product's Customer Service Maintenance Plan and implemented throughout the world by spares provisioning.

3.2 PRINT SET PART NUMBER

The site Document Control group responsible for the Field Maintenance Print Set shall request the print set part number from Engineering Information & Image Management. The number assigned is in the form:

MP-XXXXX-01 Rev XXXX

where MP is the part class for Field Maintenance Print Sets per *DEC STD 012-2 Unified Numbering Code For Part Identifier Class Codes*, and XXXXX-01 is the first variation in the unique number for each print set assigned in sequence.

The print set part revision is assigned and incremented when required by the design engineer and the CSSE maintainability engineer in accordance with *DEC STD 012-0 Part Identification Standard*.

The Engineering Information & Image Management group provides release information of assigned print set part numbers and the titles are entered into the Field Maintenance Print Set index. The index can be retrieved from any site microfilm reference file, under the heading MP Index.

3.3 TABLE OF CONTENTS

The site Design/Drafting group prepares the Table of Contents drawing from information provided by the design engineer. The Table of Contents will list those selected engineering documents that describe the product referenced in the Title block. See Figure 2. It will also list the variations of that product that is covered by the print set.

The Table of Contents for a higher-level option print set may reference one or more complete print sets by print set part number. Those print sets included will provide their own Table of Contents.

When it is necessary to include a complete print set within a higher-level print set, include the word *complete* in parentheses after the print set part number specified in the Table of Contents. If the complete print set is not required in a higher-level print set, the design engineer may select only those drawings from the lower-level print set that are required by the Customer Service engineer and list them separately.

Whenever possible, a single Field Maintenance Print Set shall be defined for all variations of the hardware product. If this is not possible, the sets will be identified by different variants of the basic number.

The Table of Contents drawing will include the following proprietary information headers.

- THIS PRINT SET CONTAINS INFORMATION ON PRODUCTS WHICH MAY BE SUBJECT TO PATENTS HELD BY DIGITAL EQUIPMENT CORPORATION. THIS PRINT SET SHALL NOT BE REPRODUCED OR COPIED, OR USED IN WHOLE OR IN PART AS THE BASIS FOR MANUFACTURING OR SALE OF SUCH PRODUCTS, WITHOUT WRITTEN PERMISSION OF DIGITAL.

The Table of Contents drawing will include the following copyright notice.

- *COPYRIGHT © DIGITAL EQUIPMENT CORPORATION, [insert year of original print set release and year of most recent revision].*

Example: COPYRIGHT © DIGITAL EQUIPMENT CORPORATION, 1988, 1990

3.4 CONTENTS AND ORGANIZATION

The design engineer and the maintainability engineer will determine the contents of the Field Maintenance Print Set. When the print set organization impacts the Product Documentation Plan for the product, Educational Services Development and Publishing will provide assistance (if required).

The following examples illustrate typical print set contents and organization for various types of products.

3.4.1 Single-Module Options

The MP print set for single-module options may be as simple as an Illustrated Parts Breakdown (IPB) calling out the FRUs and their Digital part numbers. It may also contain the bit field descriptions of device registers, as well as any other troubleshooting aids that would help isolate a failure to the FRU, for example, flow charts or error code descriptions.

Figure 2: Table of Contents Sample (MP class)

THIS PRINT SET CONTAINS INFORMATION ON PRODUCTS WHICH MAY BE SUBJECT TO PATENTS HELD BY DIGITAL EQUIPMENT CORPORATION. THIS PRINT SET SHALL NOT BE REPRODUCED OR COPIED, OR USED IN WHOLE OR IN PART AS THE BASIS FOR MANUFACTURING OR SALE OF SUCH PRODUCTS, WITHOUT WRITTEN PERMISSION OF DIGITAL.																					
FIELD MAINTENANCE PRINT SET																					
TABLE OF CONTENTS B-TC-LLF01-0-2 D-AR-LLF01-0-DBU K-PL-LLF01-0-DBP D-IA-BC27J-0-0 D-BS-LLF01-0-0 FIELD MAINTENANCE PRINT SET TOP LEVEL UNIT ASSY. PARTS LIST CABLE ASSEMBLY COVERTER BLOCK DIAGRAM										UNIT VARIATIONS COVERED BY THIS PRINT SET		LLF01 FIELD MAINTENANCE PRINT SET COPYRIGHT C DIGITAL EQUIPMENT CORPORATION, 1988 PRINT SET ORDER NO. MP02717-01									
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													SIZE B	CODE TC	DOCUMENT NUMBER LLF01-0-2			REV. A			
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This print set should work as a complement to the maintenance strategy of the device and provide alternatives when normal diagnostic procedures do not isolate the problem.

This print set must not contain or reference Digital information beyond the FRU level.

3.4.2 Multipart Module Options

When a single module option is shipped with additional parts, such as cable assemblies, include the Parts List (PL) that lists all parts for the complete option in the Field Maintenance Print Set.

Include cable drawings if the service information is not shown on other drawings that are included.

3.4.3 Multimodule Options

The "MP" Print Set for multi-module options should contain a definition of what the option FRUs are, possibly in the form of an IPB. The print set should also include a description of the logic functions within each FRU and a clear description of how the FRUs interface. This description may be in the form of a functional block diagram of every module with their I/O connection pins clearly marked, or in the form of a troubleshooting flowchart with test points on the modules or backplane to help in functional isolation.

This print set should complement the maintenance strategy of the device by giving the Digital engineer or self-maintenance customer some alternatives when normal diagnostic procedures fail to isolate the failure to the FRU.

This print set must not contain or reference Digital information beyond the FRU level. The following examples describe the elements to be contained for multi-module options with or without backplanes.

- Multimodule Option (without backplane)

This option requires an IPB that calls out the module part numbers, the part numbers of any cables that connect to the modules, and a diagram of how the parts go together. This option should also contain a functional block diagram of the logic on each of the modules, with the connection between the modules, cables, or connector pins clearly shown.

- Multimodule Option (with backplane)

This option requires an IPB that calls out the part numbers for the module, backplane, and cables, as well as a diagram of how the parts go together. This option should also contain a functional block diagram of the logic on each of the modules, with the backplane pins and cable connector pins clearly shown.

3.4.4 Other Hardware Products

Organize the Field Maintenance Print Set as follows.

- Table of Contents (TC)
- Drawing Directory in DRB 126C format
- Top-level Unit Assembly (UA) and Parts List (PL) for major component and replaceable parts identification
- Drawings for assemblies that show and list parts down to the lowest-level FRU

- Module Utilization (MU) when appropriate to the hardware product.
- Top-level cable interconnect drawings and drawings that are needed for add-on cabling and mounting, flow charts, timing diagrams, block schematics, and system block diagrams for troubleshooting.
- When a Field Maintenance Print Set currently exists for an option or device that is part of the hardware product, consider the following alternatives.
 - If the device is used with numerous hardware products or its print set contains a large number of drawings (RK05, for example), the print set should be printed and stocked separately. Do not include the print set. Instead, make sure it is specified as a separate item on the ship list used by manufacturing for your hardware product.
 - If the device is used with only a few other hardware products and contains only two or three drawings, it is probably not cost-effective to print and stock as a separate print set. In this case, include the complete print set as part of the Field Maintenance Print Set being defined.

NOTE

If it is not apparent which alternative is more cost-effective, specify the print set in question as a separate item in the ship list. Both alternatives can be implemented on the same print set, as shown in Figure 2.

3.5 EXCLUDED ENGINEERING DRAWINGS

The following types of engineering drawings are not required in the Field Maintenance Print Set.

- Mechanical fabrication drawings and other types of drawings of parts that cannot be repaired in the field. Some mechanical drawings may be included per subhead 3.4.
- Tabular drawings and documents, such as wirelists, ROM lists, or microcode lists. These types of lists must be included in the Maintenance Documentation Service (MDS) and Customer Service Microfiche Libraries for the particular product. This activity is coordinated by the assigned maintainability engineer.
- The 50- numbered MD drawings that show drill hole locations on modules and EC drawings that show the printed-circuit pattern.
- Engineering specifications, unless they are intended for Customer Service use.
- Purchase specifications.
- Documentation of internal IC functions.
- Documentation that is classified DIGITAL RESTRICTED DISTRIBUTION, DIGITAL CONFIDENTIAL, or DIGITAL INTERNAL USE ONLY, per DEC STD 128-0.

APPENDIX A REFERENCED DOCUMENTS

A.1 EL-Class Digital Documents

EL-Class Number	Document Title
EL-00003-00	<i>DEC STD 003-0 Hardware Manual Standard</i>
EL-00012-00	<i>DEC STD 012-0 Part Identification Standard</i>
EL-00012-02	<i>DEC STD 012-2 Unified Numbering Code for Part Identifier Class Codes</i>
EL-00013-00	<i>DEC STD 013-0 Standard Engineering Drawing Formats and Forms - Introduction</i>
EL-00024-01	<i>DEC STD 024-1 Top Document Requirements - DRB 126C Format</i>
EL-00128-00	<i>DEC STD 128-0 Security Classifications for Engineering Intellectual Property Policy and Procedures</i>
EL-00162-00	<i>DEC STD 162-0 Micrographics: Format and Quality Requirements for Microfilm</i>
EL-00182-00	<i>DEC STD 182-0 Engineering Documentation Acceptance Criteria</i>
EL-00185-01	<i>DEC STD 185-1 Requirements for Releasing Unigraphics Data Bases</i>

Use VTX SMC to order copies of EL-class documents from Standards and Methods Control. Send distribution questions to JOKUR::SMC or call DTN: 234-4423.

A.2 Other Documents

The Support Print Set listing is available from any microfilm reference library, and is sorted sequentially by EM part number and by option name. Ask for the EM listing.

The Field Maintenance Print Set listing is available from any microfilm reference library, and is sorted sequentially by MP part number and by option name. Ask for the MP listing.

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